Claims

[c1] 1.An image sensor, comprising:
an array of photosensing devices arranged into columns and rows;
a column readout part which reads out said photosensing devices a row at a time;
a gain stage, coupled to receive an output of said column readout part, and to increase a level of said output readout part; and an output driving stage, which drives an output signal,
wherein each of said column readout part, said gain stage, and said output driving stage include at least one element which optimizes a power consumption of the stage independent of other stages.

[c2] 2. An image sensor as in claim 1, wherein said column readout part operates in a charge mode.

[c3] 3. An image sensor as in claim 1, wherein said column readout part optimizes bias voltages.

[c4] 4. An image sensor as in claim 3, wherein said column readout part produces specified bias voltages only during a time when those bias voltages are actually being used.

[c5] 5. An image sensor as in claim 1, wherein said column readout part includes an element that minimizes a stray capacitance.

[c6] 6. An image sensor as in claim 5, wherein said element that minimizes stray capacitance includes a multiplexer formed in multiple stages, each stage having fewer than all of the full number of signals.

[c7] 7. An image sensor as in claim 1, wherein said gain stage includes isolation stages which isolate an actual element carrying out the gain from input and output.

[c8] 8. An image sensor as in claim 1, wherein said gain stage includes an input unity gain buffer stage, an output unity gain buffer stage, and a gain stage coupled between said input unity gain buffers stage and said output unity gain

buffer stage.

[c9] 9. An image sensor as in claim 8, wherein each of said unity gain input stage, unity gain output stage and gain stage include at least one reset element which allows resetting of voltage there across.

[c10] 10. An image sensor as in claim 8,further comprising an offset clock which operates said buffer stages at different times.

[c11] 11. An image sensor as in claim 10, wherein said offset clock includes a two phase non overlapping clock in which the different buffer stages are clocked by different phases.

[c12] 12. An image sensor as in claim 1, wherein said output driving stage includes an A/D converter.

[c13] 13. An image sensor as in claim 12, wherein said A/D converter includes first and second A/D converters operating out of phase with one another.

[c14] 14. An image sensor, as in claim 13, wherein one of said A/D converters is associated with first color pixels, and a second of said A/D converters is associated with second color pixels.

[c15] 15. An image sensor, comprising:
an array of photosensitive pixels producing output signals indicative of values of said pixels; and
first and second A/D converters, said first A/D converter associated with first color pixels, and said second A/D converter associated with second color pixels, said first and second A/D converters having staggered operating timing, such that one of the A/D converters starts operating when a different A/D converter is continuing to operate.

[c16] 16. An image sensor as in claim 15, wherein said first A/D converters receives data from green pixels, and said second A/D converters receives data from red and blue pixels.

[c17] 17. An image sensor as in claim 16, wherein said A/D converters are successive

approximation A/D converters.

[c18] 18. An image sensor, comprising:
an array of photosensitive pixels;
a timing and control logic, having a plurality of control parts, said plurality of control parts individually controllable and turned off when not in use.

[c19] 19. An image sensor as in claim 18, wherein one of said plurality of control parts is a voltage clamp which is turned off when not in use.

[c20] 20. An image sensor as in claim 18, further comprising an element that minimizes parasitic capacitance on the readout bus.

[c21] 21. An image sensor as in claim 20, wherein said element includes an optimized gain element with first and second unity buffer stages, and a gain stage, said first and second buffer stages isolating a gain stage from the readout bus.

[c22] 22. An image sensor as in claim 18, wherein said control part includes a controllable bias element which is turned off to remove said bias when not in use.

[c23] 23. An image sensor as in claim 22, wherein said controllable bias element includes a digitally controllable bias element.

[c24] 24. An image sensor as in claim 18, wherein said timing and control logic produces a converter reference voltage, a clamped voltage, and a common mode feedback voltage.

[c25] 25. An image sensor as in claim 24, where each of said converter reference voltage, clamped voltage, and common mode feedback voltage are produced by separate, controllable sources, which are turned off when not in use.

[c26] 26. A method, comprising:
reading out pixel values from an array of photosensitive pixels;
A/D converting pixel values from green pixels in a first A/D converter, at a first timing; and
A/D converting pixel values from blue pixels in a second A/D converter at a

second timing offset from said first timing.

[c27] 27. A method as in claim 26, wherein said second timing is 50 percent of the way through a conversion cycle represented by said first timing.

[c28] 28. A method as in claim 26, wherein said A/D converting comprises successive approximation A/D converting.

[c29] 29. A method of acquiring an image, comprising:
producing bias electrical values to be used as part of acquiring image signals; and
turning off said bias electrical signals at times during the acquiring when the biases are not needed.

[c30] 30. A method as in claim 29, wherein the bias signals include a clamped signal.

[c31] 31. An image sensor as in claim 1, wherein said column readout part includes a timing and control logic which has multiple outputs, each of which can be independently turned off when not in use.

[c32] 32. A method as in claim 29, wherein said producing comprises mirroring a single bias value multiple times, and turning off said mirroring as said turning off.